Unit: Statistics, Graphs, and Data

MISSISSIPPI FRAMEWORKS FOR THE UNIT:
5a) Use proportions, estimates, and percentages to construct, interpret, and make predictions about a population based on histograms or circle graph representations of data from a sample. (DOK 2)

5c) Construct and interpret line graphs, frequency tables, circle graphs, box-and-whisker plots, and scatter plots to generalize trends from given data. (DOK 2).

This unit (in my 6 Day) does not cover all of the graphs that need to be hit in the objective. I wanted a day on interpreting data and generalizing and a day for the students to complete their projects.

Students have completed a questionnaire for homework over the weekend. It asks them about themselves and their families. Their answers to these questions will be compiled in a set that will be given to them. We will use this data all week for our homework assignments.

The project will consist of them creating a small survey, and with guided help, creating graphs and writing a persuasive essay. The project deals with the manipulation and interpretation of information. They will conduct a survey in pairs on any topic they wish (that is appropriate). With the results they will create graphs. Each will take a different side and try and persuade the viewer/reader with graphs and a persuasive essay.

Basic Schedule*:

Monday: Compiling Data and Frequency Tables
Tuesday: Histograms
Wednesday: Circle Graphs
Thursday: Box-and-Whisker Plots
Friday: Manipulating Data
Monday: Finalize Project

*I am double blocked, so I see my kids every single day in their same classes. So the time frame is short. The unit starts on a Monday and ends on a Monday. The final project serves as two test grades in lieu of a test.

I have tutoring sessions every Monday, Wednesday, and Thursday after school from 3:00 to 4:30. During this time, students have a chance to ask questions about what we have learned, help each other with their homework problems, and work with extra examples to further their understanding. (Indicator 5)
Day 1 - Compiling Data and Frequency Tables

Sam Williams
Chastain Middle School
7th Grade Math

95 minutes

OBJECTIVE
We will construct frequency tables based on data collected by students over the weekend.

SET
Have the students share what they have written during the Bell Ringer.
“Today starts are new unit, which we might call The Display and Interpretation of Information. This weekend you collected information about yourself, your family, and where you live. This week we will be working with this information and displaying it in several ways. We will then interpret this information and try and make claims about populations bigger than ourselves. Today we will be compiling our information. Right now, everyone has a little piece and apart this is not all that useful. We will need to work together to make this information very worthwhile. We will compile our data into frequency tables. Has anyone used a frequency table before?”

MATERIALS
label for each question
bin, box, or can for each question
worksheets for homework
overhead projector
dry and wet erase markers
pencils and paper
textbooks

PROCEDURE
(8 mins) Bell Ringer. The students will write about what experiences they have had with information; with graphs, tables and charts; and with persuasion.

(10 mins) Set.

(35 mins) Notes on frequency tables. During the notes, students will (3 at a time) get up and deposit their question answers in the corresponding bins for each question. By the end of the notes, the questions will be needed by the class so that we can compile the data.

(25 mins) Compiling the Data. Each student will compile data for one of the questions. They will create a frequency table and record the data in the table. These should be turned in at the end of class.

(10 mins) Interpretation of the Data. A list of questions will be on the overhead for students to answer once they have completed recording their data. They should answer these on a separate sheet of paper from the frequency table, but the table will be needed to answer the questions.
(7 mins) Closure.

**CLOSURE**
Have the students list three things they know about frequency tables. Have them list at least one purpose of frequency tables.
“Today we worked with frequency tables. Tomorrow we will start working with a more visual way of presenting data and information. These will be called histograms and they are a lot like bar graphs.”

**ASSESSMENT**
*Informal*
Students will be asked questions about what they are doing, what the tables show, how they might extrapolate to other seventh graders by the teacher as he walks around the room during the “compiling” and “interpreting” activities.

*Formal*
Students will complete a worksheet that will assess their ability to construct and interpret frequency tables. This will be graded and grades will be recorded in the grade book.
Day 2 - Histograms

Sam Williams
Chastain Middle School
7th Grade Math

95 minutes

OBJECTIVE
We will construct and interpret histograms from frequency tables of data collected by the students.

SET
Have students write about when they have seen or used or been persuaded by bar graphs or histograms.
“Yesterday we constructed frequency tables from the information that we found over the weekend. But frequency tables did not provide us with a very visual way of displaying the data. Today we will use histograms to display this data that we collected. We will have to determine data that is appropriate to display in a histogram and then construct that histogram.
Has anyone seen, used, or heard of a histogram before?”

MATERIALS
data set (frequency tables)
worksheets for homework
project description sheet
overhead projector
dry and wet erase markers
pencils and paper
textbooks

PROCEDURE
(10 mins) Do Now. Interpretation of frequency tables. RB p6 (1-4) create a histogram. Answer questions from the overhead.

(8 mins) Set.

(30 mins) Notes on histograms. The student will receive a collection of all the data collected and compiled from the previous day. They will need to hold on to this for the duration of the two week unit, since our data, homework, and classwork will come from this set.

(20 mins) Practice. The student will use the data to create histograms of their choosing. Two of these will be turned in the following day for a daily grade.

(20 mins) Begin of Project. Students will be given a sheet with information on the project. What they need to do and what the timeframes and logistics are. They will be joined with their assigned pair and begin to discuss what topic they would like to focus on. Possible topics include school lunches, dress code policy, sixth graders and participation in sports.
(7 mins) Closure.

CLOSURE
The class will create a venn diagram (double bubble map) between “frequency tables” and “histograms” and their display of information.

ASSESSMENT
Informal
Students will write any questions they still have on a scrap piece of paper and place it in the “Question Box.” The teacher will read these before the next class and they will be discussed at the beginning of the next class.

Formal
Students will complete a worksheet that will assess their ability to construct and interpret histograms. This will be graded and grades will be recorded in the grade book.

ADDITIONAL WORK
Students will create three questions they would like to ask in their survey.
Day 3 - Circle Graphs

Sam Williams
Chastain Middle School
7th Grade Math

95 minutes

OBJECTIVE
We will construct and interpret circle graphs from frequency tables of data collected by the students.

SET
Have the students make a table and list five different things they could look at that might be appropriately displayed in an histogram and five things that would inappropriately be displayed in an histogram.

“Yesterday we constructed histograms from our frequency tables. What sort of information can be appropriately displayed by a histogram?

What sort of information is less appropriate to be displayed in a histogram?

Today we will construct circle graphs. Circle graphs are appropriate at different times than histograms. Some of our questions are not suitable for histograms but are suitable for a circle graph. Today we will construct circle graphs from our data sets. We will have to select which questions are appropriate to be shown through circle graphs and then create these graphs.”

MATERIALS
data set (frequency tables)
worksheets for homework
overhead projector
dry and wet erase markers
pencils and paper
textbooks

PROCEDURE
(10 mins) Do Now. Interpretation of histograms. RB p7 (9,11-13).

(7 mins) Set.

(20 mins) Notes on proportions for finding the degrees of circle graphs.

(20 mins) Practice. The students will use the data to create proportions to find what degree they need to draw for each section or response.

(10 mins) Notes on drawing circle graphs.

(10 mins) Practice. The student will use the data to create circle graphs of their choosing. Two of these will be turned in the following day for a daily grade.

(10 mins) Project. Students will choose two questions for their group to ask. One will be
included in the survey. They should indicate their first and second choice. These should be written on a piece of paper and turned in.

(5 mins) Closure.

**CLOSURE**
The class will create a venn diagram (double bubble map) between “circle graphs” and “histograms” and their display of information.

**ASSESSMENT**

*Informal*
Students will write any questions they still have on a scrap piece of paper and place it in the “Question Box.” The teacher will read these before the next class and they will be discussed at the beginning of the next class.

*Formal*
Students will complete a worksheet for homework which will require them to construct and interpret circle graphs. This will be turned in the following day and grades will be recorded in the grade book.
Day 4 - Box-and-Whisker Plots

Sam Williams
Chastain Middle School
7th Grade Math

95 minutes

OBJECTIVE
We will construct and interpret box-and-whisker plots (from here: box plots) from frequency tables of data collected by the students.

SET
Have the students write their thoughts about this question: How have we displayed information so far? Have them share it with the class if they would like.
“This unit is about the display and interpretation of data. Today we will learn another way to display information. It is called a box-and-whisker plot and it displays the distribution of data. Box plots make use of several bits of information about data that we will need to calculate, mainly the median and range.”

MATERIALS
worksheets for homework
surveys
overhead projector
dry and wet erase markers
pencils and paper
textbooks

PROCEDURES
(10 mins) Do Now. Interpretation of circle graphs. RB p320 (1-4).

(8 mins) Set.

(35 mins) Notes on Range, Median, First Quartile, and Third Quartile. Notes on Box Plots.

(20 mins) Practice. Students will construct box plots based on their data set.

(15 mins) Project. The students will receive their surveys. They should survey two students from Chastain Middle School each. These will be due the following class. They should only survey students that haven't filled out the survey already. The survey will consist of the questions from all three classes (so every group will have about 150 answers to their question).

(10 mins) Closure.

CLOSURE
The class will create a table for box plots. Example below.

<table>
<thead>
<tr>
<th>Things we need to know to construct a box plot</th>
<th>Things a box plot tells us</th>
</tr>
</thead>
</table>
| “Tomorrow we will talk about the manipulation of information. This may be important for your
project which we will complete next week.”

**ASSESSMENT**

*Informal*
Students will write any questions they still have on a scrap piece of paper and place it in the “Question Box.” The teacher will read these before the next class and they will be discussed at the beginning of the next class.

*Formal*
Students will complete a worksheet in which they will need to construct and interpret box plots. This will be graded and grades will go in the grade book.

**ADDITIONAL WORK**
definition of “outlier” (due Monday)
Day 5 - Manipulation of Information - Graphs

Sam Williams
Chastain Middle School
7th Grade Math

95 minutes

OBJECTIVE
We will discuss the manipulation of the display of information. We will use techniques to effectively manipulate the display of information.

SET
Have the students make a venn diagram (double bubble map) between “box plots” and “frequency tables.” Have students share some of their ideas.
“What sort of graphs have we worked with so far?
Today we will be using graphs such as the ones we have been creating this week to persuade how the viewer might change his or her opinion of a set of data.”

MATERIALS
handouts for discussion
a copy of the rubric for the project
overhead projector
dry and wet erase markers
pencils and paper
textbooks

PROCEDURES
(25 mins) Do Now. Interpretation of Box Plots. RB p7 (9, 11-13)
Class Discussion of Box Plots. What information do they show? What things can they tell us about the data?
Students will get in groups of threes and discuss their box-and-whisker plots. Have the students describe what would happen if an outlier entered their data set. What parts of the plot would be effected the most and the least?
The students will make a poster on chart paper for their group which describes what a box-and-whisker plot is used for, what it tells us, and how an outlier effected their plot. They will then present their poster to the class and answer questions that students might have.
In this way, stronger students can work with more challenged students and help them to understand the usefulness of box plots. They can show them how to construct box plots and how the outlier effects certain parts and not others. This will give students a chance to extend their understanding, either by explaining what they know to other students or by having another student explain it in different ways from the teacher. *(Indicator 5)*

(8 mins) Set.

(15 mins) Discussion of the Manipulation of Data.
(20 mins) Practice. Students will create a graph based on a frequency table and then create another graph that presents the information in a different light.

(20 mins) Compilation of Data from Surveys. Students will create a frequency table in their pairs and mark the answers for their four surveys. These surveys will then be passed to the next group as they receive surveys from the group before them. In this way all students will collect the answers to their question. They will use this information to think about what they will create on Monday.

(5 mins) Closure.

CLOSURE
The class will have a brief discussion of what we want to shoot for on Monday.
“On Monday we will be finalizing our projects in class. You will have about 30 minutes to work on your project and about 60 minutes to write a persuasive essay persuading someone to your position. You and your partner will have to take different sides to your issue.”

ASSESSMENT
Informal
Students will write any questions they still have on a scrap piece of paper and place it in the “Question Box.” The teacher will reads these before the next class and they will be discussed at the beginning of the next class.

Formal
Students will complete a project on Monday and Monday night (due Tuesday) in which they will need to manipulate information using graphs and persuade a viewer/reader to their opinion.

ADDITIONAL WORK
Students will write three sentences on what their project is, what position they plan to persuade others to, and what sorts of graphs they will be creating for their project.
Day 6 - Project Finalization

Sam Williams
Chastain Middle School
7th Grade Math

95 minutes

OBJECTIVE
We will complete our projects that will require the creation and interpretation of frequency tables, histograms, box-and-whisker plots, and circle graphs.
We will manipulate data and compose persuasive essays to persuade others to our opinions.

SET
"Last week we manipulated some information and studied techniques that allowed us to do this. Today we will be doing this in our projects to persuade others to our point of view on our issues." Three students will be selected to share their ideas of what their project will be and how they will accomplish this using graphs and reasons in their essay.

MATERIALS
overhead projector
dry and wet erase markers
pencils and paper
textbooks

PROCEDURES
(10 mins) Do Now. Students will begin to work on their project in their pairs. About ten minutes into class, the teacher will stop work for a short discussion (the set).

(10 mins) Set.

(20 mins) Pairs work. Creation of graphs and discussion of strategies. The students will choose which angle of their topic they would like to take and create graphs to persuade the viewer towards their opinion. This is the team section of the project.

(8 mins) Class Discussion. The class will take a few minutes to talk about what sorts of positions students are taking and what their reasons and strategies are for arguing this.

(35 mins) Persuasive Essay writing. Students will have time to write an in-class persuasive essay to persuade the reader to their point of view.
When students finish their essay they may continue to work on their graphs while others finish.

(7 mins) Explanation of Extra Research. Students will be required to research a time in history when a people were taken advantage of through the manipulation of data. The students will find a society in which this occurred. What were the effects of this manipulation? What were the real data figures that were obscured and changed? How might have this effected the way of life of these people?
This will be due the following Monday (a week from today). (Indicator 8)
(10 mins) Closure.

**CLOSURE**
Three students will be selected to talk about their positions and present the graphs that they created for the project.

**ASSESSMENT**

*Informal*
Students’ ability will be gauged by the teacher during the discussion section. Students may ask questions at this time (as well as during the pairs work) if they need guidance.

*Formal*
The project, which will test the students' ability to create and interpret frequency tables, histograms, box-and-whisker plots, and circle graphs; manipulate data; and persuade readers will be taken up the following class period. This will serve as two test grades (the essay and the graphs and rest of the project) and grades will be recorded in the grade book. No official test will be used for this unit.